Comparison of Different Types of Analgesia On Outcome of Office Hysteroscopy

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Review of Literature

Office Hysteroscopy

Introduction

The hysteroscope is a telescope attached to a light source, which is passed into the uterine cavity by way of the endocervical canal. Pantaleoni initially described hysteroscopy in 1869, but it did not achieve routine gynecologic use due to its poor optic system. However, in the last 25 years, refinement in optical and fiberoptic instrumentation, along with operative accessories, has dramatically improved visual resolution and operative techniques. Today, many hysteroscopic procedures have replaced older, more invasive techniques ***(Schenk, 1999)***.

The hysteroscope consists of 3 parts: the eyepiece, the barrel, and the objective lens. Different types of light sources exist, including tungsten, metal halide, and xenon. A xenon source with a liquid cable is considered the superior option. Most hysteroscopes have the capacity to input media and drain media in order to control for volume and visibility in clearing bubbles from the view. The tip of hysteroscope can have different angles, which allow for improved or specific visualization. The angle options are 0, 12, 15, 25, 30, and 70 degree (Fig.1) ***(ACOG, 1994; Shapiro, 1988)***

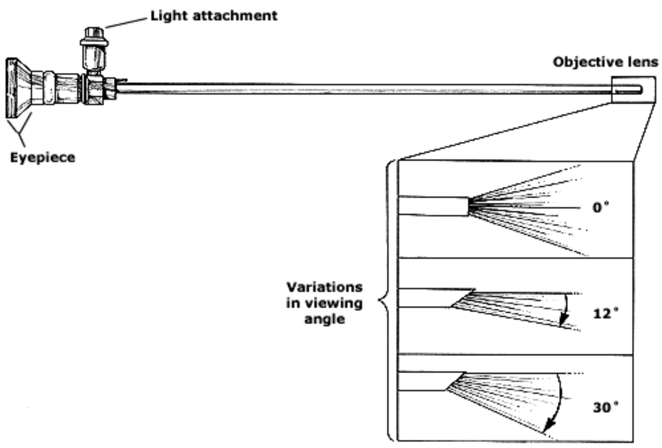

Fig. (1): Hysteroscope with different viewing angles ***(Guido, 2006).***

Surgical instruments used with the hysteroscope are available in both rigid and flexible forms to be inserted through the operating channels of scopes (e.g., scissors, biopsy forceps, grasping instrument and the rollerball used for endometrial ablation) ***(Corfman, 1988)***.

The resectoscope is a specialized instrument with a monopolar double-armed electrode with a trigger device. It cuts and coagulates tissue by means of contact desiccation with resistive heating ***(Brill, 2000)***.

In the last 10 years, technological improvements have led to the production of smaller diameter scopes. This has prompted the industry to develop sheaths which continue to have a final diameter of ~5 mm, as was the case in the old generation of purely diagnostic scopes, but this now includes the working channel and continuous flow features ***(Bettocchi et al., 1998)***.

The most important requirement for successful hysteroscopy is satisfactory distension of the uterus. While many different media have been used, recent advances in equipment have greatly simplified the use of saline for diagnostic and simple operative hysteroscopy that does not require the use of electrosurgical instrument ***(Indman, 2000)***.

Media leakage can occur through the cervix, tubal ostia, hysteroscopic channels, and uterine vessels. An inner sheath can be used for inflow of media with a larger outer sheath, which can have perforations to allow for outflow of media in order to keep the visual field clear. The delivery system can be via closed or open system, with the former using fluid returned through a pump to a reservoir and latter allowing free flow of the media out through the cervix into a collection bag for volume monitoring. For clearer visibility, an optional active suction can be placed at the outflow to clear debris from the field when needed ***(Corfman, 1988)***.

Operative hysteroscopy has been used for various indications, such as endometrial polyps, adenomyosis, uterine septa, adhesions and uterine leiomyomata, in women with abnormal uterine bleeding, infertility, recurrent pregnancy loss and IUD removal ***(Vilos, 1999)***.

Newer technology, the Versa Point system uses bipolar circuitry for electrosurgery. This system allows the use of various instruments with specific tissue effects: a spring tip for hemostatic vaporization of large areas, a ball tip for precise vaporization, and a twizzle tip for hemostatic resection and morcellation of tissue ***(Brill, 2000)***.

The advantages of bipolar technology are the use of saline solution rather than non-ionic distension media (i.e., glycine, sorbitol, mannitol) and the reduction of energy spread through the tissue during resection ***(Bettocchi and Selvaggi, 1997)***.

The new hysteroscopy has many advantages that overcome the traditional approaches. It is not only a day case outpatient procedure but is technically easy as it utililizes small scopes with sideway operating channels which allow performing any required diagnostic or therapeutic procedure ***(Cooper, 2000)***.

Hysteroscopic complications are infrequent but some complications are reported in 1 to 3% of cases. These include cervical laceration, uterine perforation, bleeding, reactions to the distention media ***(Siegler et al., 1988)***.

Today, the indications for hysteroscopic procedures in gynecologic practice are ample and clearly charted: hysteroscopy is considered the gold standard not only for visualizing the cervical canal and the uterine cavity for diagnosis, but also for treating many different kinds of benign pathologies localized to the region. Nowadays the advanced operative office hysteroscopy with 5 Fr. bipolar is already applied in the medical field. Technical development will push the indications of office hysteroscopy further forward.

Aim of the work

The objective of this study is to compare the analgesic effect of local intracervical analgesia with that of paracervical and intracervical analgesia during hysteroscopy

Historical Background:

More than hundred years elapsed before the clinical importance of hysteroscopy was to become apparent, thanks to the developments in optic system, which started in 1805 by Philip Bozzini who developed the first known endoscope to view the interior of the uterus and/or urinary bladder. In 1853, Antonin Desormeaux presented a model of the first truly workable cystoscope to the French Academy of Medicine. This scope had a reflecting mirror with central perforation for viewing ***(Valle, 1998)***.

Pantaleoni first described hysteroscopic procedure in 1869, but the technique did not excite substantial interest within the specialty until the late 1970s ***(Gordon, 1993)***. Nitze, in 1879 introduced his new instrument; a cystoscope and urethroscope using platinum wire to produce distal illumination ***(Baggish and Barbot, 1983)***. David introduced the first practical contact endoscope in 1908. This endoscope had a distal lens that permitted visualization of the uterine lesions on contact. No distending medium was necessary and external light was introduced into the uterus by reflection ***(David, 1908)***.

Heinberg, in 1914 developed a water sprinkler system for irrigating the uterine cavity. Rubin in 1925, used carbon dioxide gas for insufflation of the uterine cavity instead of water but this method did not become safe and practical until introduction of specific carbon dioxide insufflators specially designed for hysteroscopy ***(van der Pas, 1983)***. Seymour, in 1926 introduced a hysteroscope with suction tube to drain mucous and blood from the uterine cavity, while ***Van Mikulicz and Freund in 1927***, produced a hysteroscope with a rinsing system ***(Valle and Sciarra, 1979)***.

Norment in 1957 introduced practical methods using low viscosity fluids to distend the uterus, followed, in 1958, by the application of the first rudimentary gynecological resectoscope with a loop electrode to remove myomas and polyps. In late 1960s, Menken developed a special hysteroscope designed for tubal cannulation ***(Valle, 1998)***. In 1970 Edstrom and Fernstrom successfully used a high molecular weight dextran (Hyskon) for uterine distention. In the same year, Quinones et al., initiated the practical use of dextrose 5% in water delivered under pressure for uterine distention ***(Valle and Sciarra, 1997)***. In 1972, Lindman demonstrated the safety of C02 as a distending medium provided the flow rate and intrauterine pressure are kept within limits ***(Gordon, 1993)***.

In 1974, the initial therapeutic applications of hysteroscope were established by Edstrom, including the division of intrauterine adhesions, treatment of uterine septa and resection of submucous leiomyomas ***(Valle, 1998)***.

In early eighties, Hamou developed a new endo-scope, the microcolpohysteroscope, which offered a combination of panoramic hysteroscopy, contact hystero-scopy and microhysteroscopy with a magnification up to x150 ***(Hamou, 1983)***. In 1981, Baggish invented a focusing panoramic hysteroscope with a four channel operating sheath particularly advantageous for laser hysteroscopic procedures ***(Baggish and Barbot, 1983)***.

At the beginning of the 1990s, new scopes were introduced with a diameter ranging between 1.2 and 3 mm and operative sheaths with a diameter equal to or less than 5 mm. These allowed the physician to adopt an operative scope equipped with mechanical instruments even for a diagnostic procedure ***(Bettocci et al., 1998)***.

Between the end of the 1970s and the beginning of the 1980s, the modern hysteroscopic approach was reported by various authors ***(Valle, 1983)***. For the next 10 years or more the cervix and the uterine cavity were examined using a diagnostic hysteroscope with a total diameter of 5 mm, consisting of a 4-mm rod lens system scope inserted in a simple sheath, necessary to guide the distention media (CO_2) into the uterine cavity.

A speculum was inserted in the vagina to visualize the portio and the external cervical os (ECO), whereas a tenaculum was used to facilitate the insertion of the diagnostic hysteroscope. To avoid pain related to the application of the tenaculum, traction on the cervix, and stimulation of the muscle fibers of the cervical canal, local anesthesia or a paracervical block were frequently used ***(Zullo et al., 1999)***.

Diagnosis was based on the visual examination of the cervical canal and of the uterine cavity; for this reason the reliability of the procedure was strictly related to the gynecologist's experience and it was not problem-free. There were only two options for performing biopsies: blind procedures (eg, dilation and curettage, Vabra, Pipelle, and so forth) or targeted hysteroscopic biopsies (THB), using an operative sheath running over the existing 4-mm scope. In the former case, because of the blind nature of the procedure adopted, hysteroscopy could not support a definitive final diagnosis, whereas in the latter case the need for dilatation of the cervical canal and related anesthesia because of the large diameter of the operative hysteroscope offset the advantage of performing a THB ***(Bettocchi et al., 2003)***.

No significant technologic improvements were reported in the field of hysteroscopes throughout the 1980s. Moreover, electronic devices, such as electronic pumps or endocameras, were not yet available at a reasonable price. This long plateau period resulted in a situation whereby the gynecologist came to regard the previously described procedure as the standard (and ultimate) technique, and to be reluctant to accept the proposal of new developments of the technique ***(Bettocchi et al., 2003)***.

At the beginning of the 1990s, new scopes were introduced with a diameter ranging between 1.2 and 3 mm and operative sheaths with a diameter equal to or less than 5 mm (corresponding to the final diameter of the classic diagnostic hysteroscope). These allowed the physician to adopt an operative scope equipped with mechanical instruments even for a diagnostic procedure. This possibility of visual examination of the uterine cavity and contextual operative facilities has provided endoscopists with the perfect diagnostic tool: they can examine the cavity and take THB thanks to visualization of suspicious areas ***(Bettocchi et al., 2003)***.

In a short time, after acquiring some experience in handling an operative hysteroscope equipped with miniaturized instruments, physicians can perform THB and treat benign intrauterine pathologies, such as polyps and synechiae, without any premedication or anesthesia. This procedure has been defined as ‘‘see and treat’’ ***(Bettocchi et al., 2002)***. In this situation there is no longer a distinction between diagnostic and operative procedure, because a single procedure is performed in which the operative part is perfectly integrated in the diagnostic work-up.

One of the latest hysteroscopes is the Office Continuous Flow Operative Hysteroscope ‘‘size 5’’ (Karl Storz, Tuttlingen, Germany), based on a 2.9-mm rod lens system, with an outer diameter corresponding to 5 mm. Recently, a thinner version has been developed based on a revolutionary 2-mm rod lens system scope that reduces the final diameter of the hysteroscope to 4 mm (Office Continuous Flow Operative Hysteroscope ‘‘size 4,’’ Karl Storz, Tuttlingen, Germany). Both instruments feature two sheaths (one for irrigation and another for suction); an operative 5F catheter canal (approximately 1.6 mm); and are oval in shape, ideal for atraumatic insertion of the scope into the cervix. Distention of the uterus is obtained using an electronic suction-irrigation pump that can maintain a constant intrauterine pressure around 30 to 40 mm Hg, avoiding overdistention of the muscle fibers and patient discomfort. A variety of 5F catheter mechanical instruments and 5F catheter bipolar electrodes are now available ***(Bettocchi et al., 2003)***.

The vaginoscopic approach:

The vaginal cavity can be distended by introducing a distention medium to facilitate location of the cervical canal, obviating the need to assist the introduction of the scope into the cervix using the tenaculum. The anatomy can be followed by gentle movements of the hands that correctly drive the hysteroscope into the cervix and through the internal cervical os ***(Bettocchi et al., 2003)***.

Thanks to this method, which has been defined as the ‘‘vaginoscopic approach’’, the patient discomfort associated with the traditional approach to the uterus has been definitively eliminated. The vagina is distended with the same medium (saline solution) and at the same pressure (around 30 to 40 mmHg) used for the subsequent distention of the uterine cavity. There is no need to close the vulvar labia using the fingers because the weight of the liquid is sufficient to distend the vagina and provide a correct visualization of the portio ***(Bettocchi and Selvaggi, 1999)***.

The recent data of more than 11,000 hysteroscopic procedures performed using the previously described technique confirm the previously published report of strongly increased patient compliance: 99.1% of the patients referred no discomfort related to the approach to the uterus and the insertion of the scope into the cervix ***(Bettocchi et al., 2003)***.

The incidental causes of pain that complicated the procedure have been eliminated. This technique has permitted complete elimination of any type of premedication, analgesia, or anesthesia, making the procedure faster and complication-free ***(Bettocchi and Selvaggi, 1999)***.

Although diagnostic and operative laparoscopy are well established in gynaecology, diagnostic and operative hystero-scopy are not used equally worldwide. Operative hysteroscopy has been accepted progressively as the best option for the treatment of intra-uterine pathologies such as polyps, submucous myomas, septum and adhesions. Diagnostic hysteroscopy is, however, not widely used in the office setting because of the discomfort produced by the procedure. Indeed, conventional hysteroscopy is performed under general anaesthesia with a 4mm optic with 5mm external sheath, speculum and tenaculum to grasp and fix the uterus and it sometimes requires cervical dilatation. Since it seems invasive, traumatic and painful and since both physicians and patients expect diagnostic procedures to be simple, short, pain-free and ambulatory, it is not surprising that it has low acceptability, at least as a first line diagnostic tool in the office setting ***(Kremer et al., 2000).***

The most important challenge for the office approach is to reduce patient discomfort to a minimum. This should not be underestimated since many patients still prefer the in-patient approach believing that it will be pain free ***(Kremer et al., 2000).***

Over the last years, major technical improvements, such as the use of saline as distension medium ***(Nagele et al., 1996),*** the availability of high-resolution mini-endoscopes ***(Campo et al., 1999)*** and the atraumatic insertion of the instruments ***(Bettocchi and Selvaggi, 1997),*** have led to the development of the mini-hysteroscopy. This technique avoids most traumatic uterine manoeuvres leading to a less painful and better tolerated examination and has increased the feasibility and acceptability of the office diagnostic hystero-scopy ***(Cicinelli et al., 2003; De Angelis et al., 2003)***.

Office hysteroscopy induces less pain and provides better visualization than conventional hysteroscopy, probably due to the less traumatic passage through the cervical canal and the internal ostium. The differences in visualization scores were only related to the quality of visualization of the uterine cavity, rather than to the quality of image itself, since it is obvious that the 4.0 mm optic provides a better image than the 2.7 mm optic. Since the smallest fibreroptic 2.4 mm hystero-scope was required very seldom, it was postulated that the rod lenses 3.5 mm total diameter hysteroscope, combining the advantages of good optical quality and small diameter, is suitable for most cases. Although no differences in complication rates could be detected, probably due to the overall very low values, the success rates were higher with office hysteroscopy ***(Kremer et al., 2000).***

Since continuous-flow hysteroscopic technique was introduced the office hysterectopy has proved to be a powerful diagnostic tool for visualizing the cervical canal and the uterine cavity. However, outpatient hysteroscopy reduces risks associated with general anesthesia. Outpatient hysteroscopy is easy to perform, takes less time, and is cost-efficient, making it a convenient office procedure ***(Bettochi and Selvaggi, 2004).***

Continuous Flow Hysteroscope:

The scope includes an outer sheath having an outer surface, an inner surface and a hollowed-out central area extending along a central axis which extends there through. The outer sheath has a proximal section and a distal section. The distal end includes a plurality of openings communicating between the outer surface and inner surface. The openings have a predetermined shape and pass fluid exterior to the distal section there through and into the hollowed-out central area ***(Grossi et al., 1992)***.

The proximal section of the outer sheath includes an outlet and an inlet. An inner member is positioned within the hollowed-out central area and includes a first channel which is adapted to receive a telescope. A second channel, which is substantially parallel to the first channel is utilized for passing a working tool. The first and second channels are operatively coupled to an inlet for passing fluid there through and out of the distal end outer sheath. The fluid passageway cooperates with the plurality of openings to pass fluid through the opening from the outer surfaces to the inner surfaces, through the fluid passageway and through the outlet of the outer sheath. The inner member includes an obturator closure means to isolate inflow and outflow distally, to prevent cross flow and to reduce patient trauma at time of insertion of the hysteroscope ***(Grossi et al., 1992)***.

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